REMARKS

Favorable reconsideration is respectfully requested in view of the above amendments and following remarks. Claims 18-20 have been amended. The limitation in claim 18 concerning the single crystal being transparent and having a dislocation density of $10^5/cm^2$ or less is supported for example by page 9, lines 23-32. The limitation in claim 19 concerning the single crystal being transparent and having a maximum diameter of at least 2 cm is supported for example by page 9, lines 23-36. The limitation in claim 20 concerning the semiconductor layer being formed of the Group-III-element nitride transparent single crystal is supported for example by page 9, lines 16-36. Claims 61-63 are new. Claim 61 is supported for example by page 2, lines 15-21. Claim 62 is supported for example by page 18, lines 17-33, Fig. 5 and Example 5. Claim 63 is supported for example by page 10, lines 16-36. Claims 1-20 and 61-63 are pending. No new matter has been added.

Claim rejections - 35 U.S.C. § 103

Claims 1-20 have been rejected under 35 U.S.C. §103(a) as obvious over DiSalvo (US 6,579,645) in view of Kelsey (US 2002/0158267). Applicants respectfully traverse this rejection.

Claim 1 is directed to a method for producing a Group-III-element nitride single crystal. Claim 1 requires the use of a mixed flux containing sodium and at least one of an alkali metal (other than sodium) and an alkaline-earth metal. The use of a mixed flux as required by claim 1 allows a high-quality Group-III-element single crystal to be obtained at a lower pressure and on a larger scale than what is permitted in conventional techniques. These advantageous effects of the method according to claim 1 are indicated by the results shown in the Examples of the specification. As shown in the table on page 15 of the specification, the

yield of gallium nitride unexpectedly improved by more than ten times as compared to the yield obtained according to conventional methods when a mixed flux according to claim 1 was used to prepare a single crystal of gallium nitride. Significantly, the higher yields were obtained at 30 atm (see page 14 of the specification), which is considerably lower than the pressure used in conventional techniques.

DiSalvo teaches the use of a sodium flux for growing gallium nitride crystals. While the reference discloses that the reaction can be carried out in the presence of an alkaline-earth metal, the reference fails to teach or suggest preparing a mixed flux containing two or more types of metals. In fact, the reference discloses that the alkaline-earth metal merely is used optionally as a catalyst, thereby teaching away from the required use of at least one of an alkaline-earth metal and an alkali metal other than Na as part of a mixed flux.

The rejection relies on Kelsey for an alkali metal other than Na as a component of the mixed flux. The rejection's reliance on Kelsey is misplaced. More specifically, the rejection argues that it would have been obvious to modify DiSalvo by the teaching of Kelsey to use more than one metal as the flux in order to increase the luminescence properties. However, Kelsey is directed to solidifying a molten gallium metal or gallium alloy so as to form powdered gallium phosphor material, and optionally involves the incorporation of activator elements or fluxing compounds preferably in the range of 1 to 2 wt% after the formation of the powdered gallium phosphor. On the other hand, DiSalvo is directed to precipitating gallium nitride single crystal by reacting gallium and nitrogen in a reaction system containing gallium, nitrogen and sodium with a molar ratio of the flux to the material of 30 to 100%, and optionally involves the use of an alkaline-earth metal as a catalyst. As such, a person skilled in the art would not combine DiSalvo and Kelsey. Even if DiSalvo and Kelsey are combined,

the references at most would teach adding one type of metal as a catalyst in the initial reaction, or incorporating metals as additives after the formation of the gallium nitride single crystal. Therefore, claim 1 and the dependent claims therefrom are patentable over the references, taken together, or separately.

Claim 18 requires a single crystal that is transparent and has a dislocation density of $10^5/cm^2$ or less. Claim 19 requires a single crystal that is transparent and has a maximum diameter of at least 2 cm. A single crystal with properties required by claims 18 and 19 were unexpectedly obtained by employing the method according to claim 1. Nothing in DiSalvo or Kelsey, or their combination, suggests a crystal having the properties required by claims 18 and 19. In fact, DiSalvo is limited in terms of the scale of the reaction, and appears only to obtain crystal sizes between 0.1 mm and 3.1 mm. Therefore, claims 18 and 19 are patentable over the references.

Favorable reconsideration and withdrawal of the rejection are respectfully requested.

In view of the above, favorable reconsideration in the form of a notice of allowance is requested. Any questions or concerns regarding this communication can be directed to the attorney-of-record, Douglas P. Mueller, Reg. No. 30,300, at (612) 455.3804.

Respectfully submitted,

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